

## CHAPTER 7 – RECOMMENDATIONS

### CFLHD SPECIFICATIONS

Based on the literature review and information supplied through the phone survey, interviews with knowledgeable experts, bituminous materials suppliers, industry organizations, state DOTs, and other agencies, the following changes to CFLHD's *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03*, are proposed.

1. Specifications for AE-P and PEP should be added to *Section 702. – ASPHALT MATERIAL* under subsection *702.03 Emulsified Asphalt*.
2. In *Section 412. – ASPHALT TACK COAT*, asphalt binder, meeting the requirements of subsection *702.01 Asphalt Cement*, could be added to subsection *412.02*. This would allow contractors the option of tacking with the paving grade asphalt cement.
3. A reference to the requirements for tacking longitudinal and transverse joints, placed in the *Construction Manual* or *Field Materials Manual*, would remove questions regarding the necessity of tacking joints. This could be most helpful with longitudinal joints.
4. A table placed in the either the *Construction Manual* or *Field Materials Manual* with recommended application rates for different surface conditions, similar to those shown in Tables 2 and 8, could assist CFLHD field personnel with initial tack coat application rates.

### GUIDELINES FOR PRIME COAT USAGE

Before any action is taken regarding the use of prime coat, it is strongly recommended that Project Engineers consult with the Construction Operations Engineer (COE).

The following decision tree is proposed for use over aggregate bases as described in *Section 301. – UNTREATED AGGREGATE COURSES*, *Section 308. – MINOR CRUSHED AGGREGATE* and subsection *303.06 Aggregate Surface Reconditioning*. The decision tree is meant to provide CFLHD project development and field personnel decision-making guidance on how to use, when to keep, and when to eliminate prime coat.

The decision tree, in flow chart form, is shown in Figure 30. Bituminous stabilized bases, as described in sections *309. – EMULSIFIED ASPHALT-TREATED BASE COURSE*, *408. – COLD RECYCLED ASPHALT BASE COURSE* and *416. – CONTINUOUS COLD RECYCLED ASPHALT BASE COURSE*; and treated or stabilized aggregate courses, as described in sections *302. – TREATED AGGREGATE COURSES* and *304. – AGGREGATE STABILIZATION*, should not be primed.

1. Untreated aggregate base course will be exposed to wet weather for more than 7 days prior to paving.

Yes: Go to question #10.

No: Go to question #2.

2. Untreated aggregate base course will carry local and/or construction traffic more than 7 days prior to paving.

Yes: Go to question #3.

No: Go to question #8.

3. Construction traffic/haul trucks cause instability resulting in major surface deformation and reduced load-carrying capacity.

Yes: Prime coat will not help; consider stabilization (sec 302, 304 or 309).

No: Go to question #4.

4. Local traffic causes instability resulting in major surface deformation and reduced load-carrying capacity.

Yes: Prime coat will not help; consider stabilization (sec 302, 304 or 309).

No: Go to question #5.

5. Construction traffic/haul trucks cause minor surface raveling.

Yes: Prime coat would be beneficial – (surface scarification in accordance with sec 411.06 might be necessary). Go to question #10.

No: Go to question #6.

6. Local traffic causes minor surface raveling.

Yes: Prime coat would be beneficial – (surface scarification in accordance with sec 411.06 might be necessary). Go to question #10.

No: Go to question #7.

7. Dust control is necessary.

Yes: Prime coat would help (go to question #10) or consider a dust palliative (sec 306).

No: Go to question #8.

8. Pavement has steep grades and/or switchbacks.

Yes: Prime coat would be beneficial. Go to question #10.

No: Go to question #9.

9. Total HMA thickness is greater than 100 mm (4 in).

Yes: Go to question #13.

No: Prime coat would be beneficial. Go to question #10.

10. Adequate time and weather conditions prior to paving for prime coat to completely cure (minimum 72 hours cutback asphalts and 24 hours emulsified asphalts)?

Yes: Go to question #11.

No: Reschedule priming operations or delete prime coat and pave within 7 days.  
Do not pave over uncured prime coat.

11. Strong possibility of rainstorm washing uncured prime coat material into environmentally sensitive area (stream, wetland, waterway, etc.)?

Yes: Schedule priming operations to limit exposure to significant rainfall or delete prime coat and pave within 7 days.

No: Go to question #12.

12. Air pollution concerns with VOCs in solvents or other environmental concerns with liquid asphalt products?

Yes: a. Consider asphalt emulsions (AE) such as SS-1 diluted 50 percent with water applied in accordance with sec 411.06. Scarification (sec 411.06) will be necessary to obtain adequate penetration.  
b. Consider using asphalt emulsion prime (AE-P) or penetrating emulsion prime (PEP); however, these products can contain VOCs and could still cause air pollution concerns.  
c. Delete prime coat and pave within 7 days.

No: Prime using cutback asphalt (sec 702.02) or emulsified asphalt (sec 702.03) applied in accordance with section 411.

13. Application of prime coat is optional. Is there is any doubt about performance if prime coat is deleted?

Yes: Go to question #10.

No: Go to question #14.

14. Prime coat can be deleted without compromising quality and/or performance of project if paved within 7 days and before significant wet weather. Apply dust palliative (sec 306) if necessary.

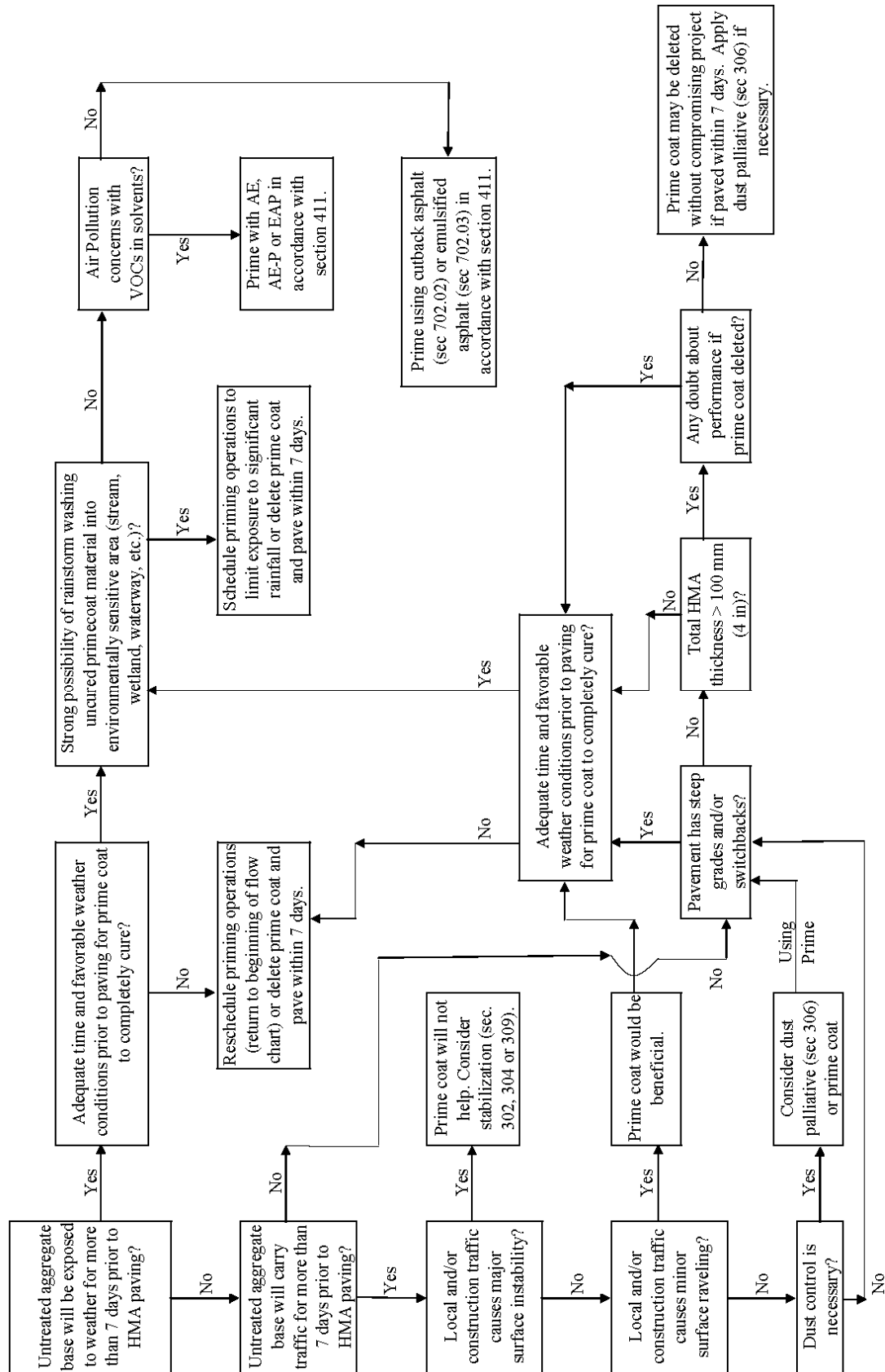


Figure 30. Flowchart. Guideline for prime coat usage flow chart.

## GUIDELINES FOR TACK COAT USAGE

Before any action is taken regarding the use of tack coat, it is strongly recommended that Project Engineers consult with the Construction Operations Engineer (COE).

The following decision tree is proposed for use with tack coat as described in *Section 412. - ASPHALT TACK COAT*. The decision tree is meant to provide CFLHD project development and field personnel decision-making guidance on how to use, when to keep, and when to eliminate tack coat. The decision tree, in flow chart form, is shown in Figure 31.

Note: If tack coat is placed, all vertical surfaces, including curb and gutters, inlets, longitudinal joints and transverse (construction) joints should be tacked prior to placing the HMA lift.

1. Is this the first HMA layer?  
 Yes: Go to question #2.  
 No: Go to question #12.
2. Is the underlying layer an existing HMA or PCC pavement?  
 Yes: Go to question #3.  
 No: Go to question #5.
3. Has the existing pavement been milled?  
 Yes: Go to question #4.  
 No: Go to question #16.
4. Apply tack coat using higher range of application rate due to rough surface. Alternately, if the HMA layer is placed shortly after milling, the fine millings can be left on the surface by not sweeping the milled pavement. The fine millings will be heated by the placement of the HMA course and can act as a tack coat. This process should be considered as experimental and is not recommended for routine use. See question #17.
5. Is the existing surface a bituminous stabilized surface (sec 309, 408 or 416)?  
 Yes: Go to question #6.  
 No: Go to question #7.
6. Is the existing bituminous surface clean, tacky and intact?  
 Yes: Go to question #15.  
 No: Go to question #16.
7. Is the base course a treated/stabilized base (sec 302 or 304)?  
 Yes: Go to question #8.  
 No: Go to question #10.
8. Did the treated/stabilized base receive a bituminous curing seal (sec 302.08 or 304.09)?  
 Yes: Go to question #9.  
 No: Go to question #14.

9. Is the existing bituminous curing seal (sec 302.08 or 304.09) clean, tacky and bonded to the existing base?

Yes: Go to question #15.

No: Sweep surface to remove seal and go to question #14.

10. The base course is an aggregate base (sec 301, 308 or 303.06). Has the aggregate base course received a prime coat (sec 411) or bituminous dust palliative (sec 306)?

Yes: Go to question #11.

No: Go to question #15.

11. Is the prime coat or bituminous dust palliative still clean, tacky, intact and bonded to the existing base?

Yes: Go to question #15.

No: Go to question #14.

12. Is the surface of the newly placed HMA layer still clean, warm ( $> 60^{\circ}\text{C}$  or  $140^{\circ}\text{F}$ ) and tacky?

Yes: A hot bond should be stronger than a tacked bond. A tack coat should not be used.

No: Go to question #13.

13. Is the surface of the newly placed HMA layer still clean and tacky?

Yes: Go to question #15.

No: Go to question #16.

14. Does pavement have steep grades and/or switchbacks or a total HMA thickness of less than 100 mm (4 in)?

Yes: Go to question #16.

No: Go to question #15.

15. Application of tack coat is optional. Is there is any doubt about performance if tack is deleted?

Yes: Go to question #16.

No: Delete tack coat.

16. Apply tack coat. Use higher range of application rate for rough or absorptive surface and the lower range for non absorptive and or flush surfaces. See question #17.

17. Strong possibility of rainstorm washing uncured tack coat material into environmentally sensitive area (stream, wetland, waterway, etc.)?

Yes: Monitor weather conditions (precipitation) and coordinate paving operations to minimize unnecessary exposure of uncured tack to significant rainfall.

No: Apply tack coat in accordance with sec. 412.

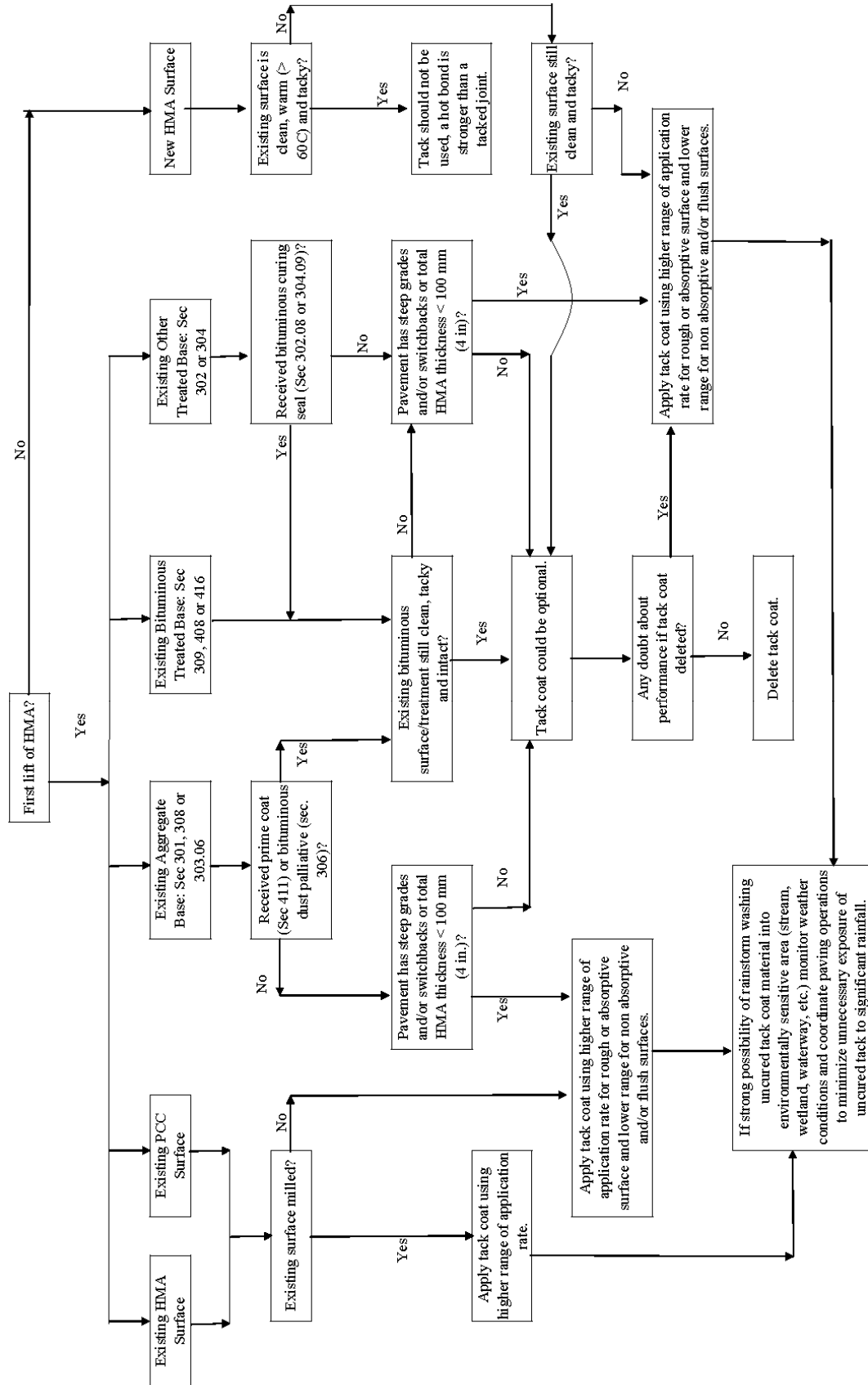


Figure 31. Flowchart. Guideline for tack coat usage flow chart.

